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WATER SUPPLY OUTLOOK

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

for

MONTANA

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE, and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with Federal, State, and private organizations listed on the inside back cover of this report. JAN. 1, 1964

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 2807, Portland, Oregon 97208.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
WESTERN UNITED STATES	MONTHLY (FEBMAY)_	PORTLAND, OREGON	ALL CDOPERATORS
BASIC DATA SUMMARY	OCTOBER 1	PORTLAND, OREGON	_ ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MARMAY)	PALMER, ALASKA	ALASKA S.C.D.
AR I ZON A	SEMI-MONTHLY (JAN.15 - APR.1)	PHDENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEBMAY)	FORT COLLINS. COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
10AH0	MONTHLY (JAN JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JANJUNE)	BOZEMAN, MONTANA	MDNT. AGR. EXP. STATION
NEVADA	MONTHLY (JANMAY)_	RENO, NEVAOA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESQUECES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JANJUNE)	PDRTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN JUNE)	_ SALT_LAKE CITY, UTAH_	UTAH STATE ENGINEER
WASHINGTON-	MONTHLY (FEB JUNE)	SPOKANE, WASHINGTON.	WN. STATE DEPT. OF CONSERVATION
WYDMING	MONTHLY (FEBJUNE)_	CASPER, WYOMING	WYOMING STATE ENGINEER
	PUBLISHED	BY OTHER AGENCIES	
REPORTS	ISSUED	D. OTHER ADENOTES	AGENCY
			ES SERVICE, DEPT. DF LANOS, ER RESOURCES, PARLIAMENT BLDG.,
CALIFORNIA	MDNTHLY (FEBMAY)	CALIF. DEPT. OF SACRAMENTO, CAL	F WATER RESOURCES, P.O. BOX 388,

WATER SUPPLY OUTLOOK

FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS

for

MONTANA

Report Prepared

Ву

Phillip E. Farnes

and

Stanley E. Cook

Snow Survey and Water Supply Forecasting Section Soil Conservation Service Box 855 Bozeman, Montana

Issued By

H. D. Hurd State Conservationist Soil Conservation Service Bozeman, Montana J. A. Asleson, Director Montana Agricultural Experiment Station Bozeman, Montana



TABLE OF CONTENTS

WATE	R SUPPL	Y OUTI	LOC	ΣK	٠	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	Page 1
SNOW	COURSE	MAP	•	٠	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•		2
SOIL	MOISTU	RE .	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	3-9
SNOW	SURVEY	DATA	•	•	•	•	•	•	•	•	•	٠	•	•	•	•	•	•	•	•	•	10-11.
RESE	RVOIR S	TORAGI	E	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	12
LIST	OF COO	PERATO	ors	3]	[ns	ic	le	Ba	ck	Cover



MONTANA WATER SUPPLY OUTLOOK as of January 1, 1964

Snow surveys made near the first of January in the Flathead River basin indicate the mountain snow pack is 118 percent of last year and 63 percent of the 1943-57 average.

In the Clark Fork drainage the water stored in the snow pack is 130 percent of last year and 68 percent average.

Gibbons Pass, the only course measured in the Bitterroot drainage, has the same water content as last year, which is 64 percent of the 1943-57 average.

East of the Continental Divide the headwaters of the Missouri, which encompasses the Jefferson, Madison and Gallatin River drainages, have a snow pack that is 132 percent of last year and 69 percent average.

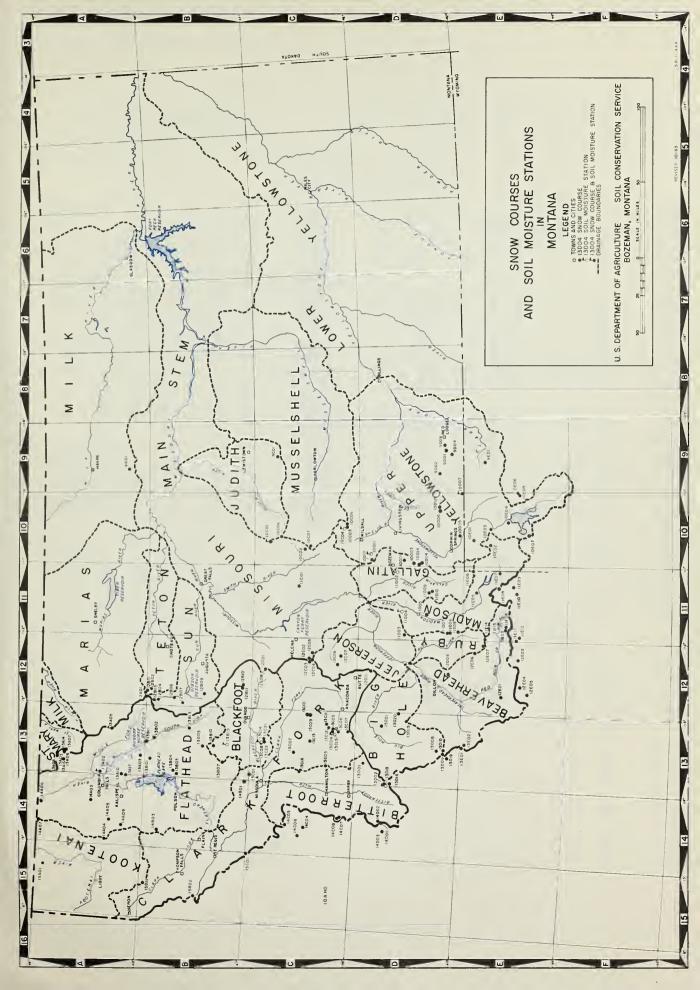
Along the Main Stem of the Missouri River the snow pack is 122 percent of last year and 71 percent average.

The Yellowstone River headwaters have a deficient snow cover. The January readings are 5 percent less than a year ago and only 58 percent of the 1943-57 average.

Mountain soil moisture is generally below average with most areas somewhat drier than a year ago. Soil moisture conditions are generally better near the Continental Divide from the southwest corner to the center of the state.

Storage in irrigation reservoirs is generally below average while power reservoirs are above average.





INDEX TO MONTANA SNOW COURSES AND SOIL MOISTURE STATIONS

			snow	coui	RSES					
Dreinage Besin & Course Name	Number	Elev.	Sec.	<u>Twp</u> . BLA RIVER	Range	Record Began	Nemsuring Dates 1/	Meas. By 2/	Drainage Besin Record Heasuring & Course Name Number Elex. Sec. Two Range Bosan Dates A	Hems. By 2/
KGCTENAL RIVER			COLUP	BIA RIVER	DASIB				CALLATIN RIVER	
Beroe Croek Brush Creek Red Kountsin Weesel Divide FLATHEAD RIVER	15811 14404 15401 14407	5500 5000 6000 5450	36 12 4 8	26N 30N 36N 37N	31W 26W 29W 24W	1956 1937 1937 1937	3,4,5, 5\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2 1,2 1,2 1,2	Arch Fells 10014 7350 3 55 6£ 1963 2,3,4,5 6 8 8 8 1963 1,4,5 6 8 1963 2,3,4,5 6 8 1963 1,4,5 6 1964 1,4 6 196	1 1 1 1 1 1 1 1 3
Bassoc Peak Bag Creek Casp Nisery Desert Mountain Fitty Creak Holl Roaring Divide Holl Roaring Divide Hollmook Kishenchin Logeo Creak Mariso Peae Mineral Creek Spotted Bear Mountain Streuberry Lie Trin Creaks Upper Nolland	14,803 13803 13817 13802 14809 14,803 13813 14,805 13805 13807 13802 13801 13801 13801 13801	\$150 6750 64,00 5600 5500 5150 5770 4530 3890 4,300 5250 4,000 6330 7000 5600 6500 3580 7000	11 7 30 24 4 11 35 18 14 34 32 29 3 23 11 9 24 28	24N 22N 31N 22N 32N 32N 32N 37N 30N 36N 17N 25N 25N 26N 26N	25V 18V 19W 19W 25W 2ZW 2ZW 2ZW 2ZW 2ZW 17W 17W 17W 15W 19W 15W	1961 1941 1962 1937 1962 1960 1942 1951 1954 1937 1934 1957 1941 1948 1948 1948	3,445, 3,445, 6 3,445, 6 3,445, 6 3,445, 6 3,445, 6 3,445, 6 3,445, 3,445, 5,54, 6 3,445, 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5,54, 6 3,445, 5	1,5 1,2 1,2 1,5 1,5 1,5 1,5 1,5 1,15 1,2 1,5 1,2	### Bruider Mountain 11:01 7950 1 9N 3E 1963 3,4 Chessans Reservoir 12005 6200 2 8N 5V 1936 1,2,3,4,5 Crystal Lake 9C01 6100 19 128 18E 1941 3,4 Eli Peak 10:077 80:00 10 8M 8E 1965 3,4,5 Gresshopper 10:002 70:00 19 8M 8E 1956 3,4,5 Gresshopper 10:002 70:00 19 8M 8E 1938 3,4 Franch Bry 90:00 10:00 19 19 8E 1938 3,4 Franch Bry 90:00 10:00 19 19 8E 1938 3,4 Franch Bry 90:00 10:00 19 19 8E 1938 3,4 Franch Bry 10:00	1 3 1 1 3 7 3 3 3 3 3 3 3
CLARK PORK RIVER Slack Pine Copper Creek Cotter Mine Coyote Hill	13C13 12B10 12B11 13810	7100 5700 6250 4200	23 1 2	8N 15N 15N 18N	15W 9W 9W 16W	1959 1962 1962 1947	3,4,5 3,4,5 3,4,5 1,2,3,4,5	1 1,2 1,2 1,2		1 1 1 1 1
El Dorado Mine Pred Burr Pess Gold Creek Lake Hoodoo Creek	13009 13011 13010 15001	7800 8000 7200 6200	23 12 14 9	8N 6N 8N	1.2W 1.3W 1.2W 2.7W	1949 1957 1949 1937	3,4,5 3,4,5 3,4 3,4,5	1 1 1 1 1 1 2	<u>JUDITH RIVER</u> Spur Park 10006 9000 20 12N 9E 1963 3,4,5	1
Intergerd Lubrecht Forest No. 3 Lubrecht Forest No. 6 Lubrecht Forest No. 6 Red Lion Stalkaho Sunatt Silde Rock Mountain Schore Lake Sturat Hill Stuart Mountain TV Mountain	13004 13021 13022 13008 13012 13003 13002 13005 13007 13006 13001 14801	64,50 54,50 46,50 40,40 71,00 72,60 71,00 65,00 77,80 65,00 74,00 68,00	6 19 23 11 22 30 35 8 19 19 6 33	5N 13N 13N 6N 6N 6N 10N 5N 4N 5N 14N 5N	13W 14W 15W 15W 13W 17W 16W 13W 13W 13W 13W 18W	1936 1951 1951 1951 1958 1937 1937 1936 1939 1936 1936	2,3,4,5 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5 3,4,5,5,4,6 3,4,5,5,4,6 2,3,4 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5	4 8 8 8 8 1 1 1 4 4 8 8	Bald Ridge	1 1 2 1 1 1 6 1 1 1 4
Ambrose East Fork R. S. Gibbons Pass Lost Horse Nez Parce Camp	13C16 13D01 13D02 14C07 14D02	6480 5400 7100 5940 5580	28 16 4 5	9N 2N 2S 4N 1S	18W 17W 19W 23W 23W	1960 1937 1934 1960 1937	3,4,5 3,4 1,2,3,4,5,5½,6 3,4,5 3,4,5	1 1,3 1	SOIL MOISTURE STATIONS COLUMBIA RIVER RASIN	
Nez Perce Pess Twin Lakes	14D01 14C08	6570 6510	25 32	1.S 5.N	24¥ 23¥	1937 1960	3,4,5 3,4,5	1		1
SASKATCHEWAN RIVER BASIN Iceberg Lake No. 3 Josephine Lover No. 9 Mount Allen No. 7 Piegan Pess No. 6 Ptarrigan No. 8	13A03 13A14 13A07 13A66 13A08	5600 4900 5700 5500 5800	1 22 27 27 36	35 N 35 N 35 N 36 N	17W 16W 16W 16W 17W	1922 1955 1922 1922 1937	5 5 5 5	3,9 3,9 3,9 3,9 3,9	Lubrecht Porest 13014M 4100 11 13N 15W 1961 Monthly	1 8 2
		K	ISSOURI R	IVER BASIN				-,,	Glbbons Pese 13018M 7100 4 25 19W 1962 Monthly Lolo Pase 14CC5M 5250 11 10W 24W 1963 Monthly <u>KISSUURI RIYER RASIN</u>	1
BEAVERHEAD RIVER									BEAVENIE AD RIVER	
Sloody Dick Carter Creek Gold Stone Lakeview Canyon Lakeview Ridge Lanhi Fass Trall Creek	13D10 12D04 13D09 11E04 11E03 13E01 13E02	7600 7400 8100 6930 7400 7480 7090	12 22 11 26 27 9	85 85 145 145 105 105	16W 7W 16W 2W 2W 15W 15W	1948 1963 1948 1948 1948 1948	3,4,5 3,4,5 3,4,5 3,4,5 3,4,5 3,4,5	1 1 10 10 10	HADISON ENTER Red Bluff 11D04H 4800 7 3S 1E 1961 Nonthly	10
White Pine Ridge RUBY RIVER	12E01	8850	18	145	9₩	1948	3,4 3,4,5	i		1 6
Clover Meedow Divide Notch	11D08 12E07 12E06	8600 7900 8500	28 14 18	98 125 115	29 49 49	1963 1963 1963	3,4,5 3,4,5 3,4,5	1 1		1 1
HIG HOLE RIVER									TELLOUSTONE RIVER	1
Abundance Lake Derkhorse Lake Elk Norn Springs Foolhen Jahnke Creek	13D20 13D19 13D15 13D21 13D08	8800 8600 7800 8500 7340	7 4 21 11 25	35 45 15 75	11W 16W 12W 13W 16W	1963 1963 1935 1963 1948	3,4,5 3,4,5 3,4,5 3,4,5 3,4,5	1 3 1		6 1
JEFFERSON RIVER									LEGENO	
Berry Mesdow Picnic Greunde Pipestone Pass MADISON RIVER	12007 12006 12001	7300 6500 7200	17 10 10	5N 5N 1N	5W 6W 7W	1962 1941 1938	3,4,5 2,3,4 1,2,3,4,5	1 4 1	$\frac{1}{2}$ Numerols 1,2,3,4,5,5 $\frac{1}{2}$,6 refer to Jenuary 1, February 1, March 1, April 1, May 1, May 15 and June 1. $\frac{1}{2}$ Numerols refer to Agency that secures the snow survey as follows:	
Call Road Crockett Lake Hebgen Dan Jsck Creek Worth Meadow West Tellovstone	11007 11006 11E05 11D05 11D03 11E07	8050 8400 6550 6800 7500 6700	21 20 22 13 23 34	86 85 115 66 33 135	29 29 38 1E 39 5E	1962 1962 1934 1961 1961 1934	3,4,5 3,4,5 1,2,3,4,5 3,4 3,4 1,2,3,4,5	1 1 3 1 1 3	1. Soll Conservation Service 6. National Park Service 2. U. S. Forest Carrice 7. Montana Experiment Station 3. U. S. Geological Survey 8. Nontana State Forestry School 4. Nontana Power Company 9. Dealino Water & Power Burseu 5. U. S. Indian Service 10. Burseu of Sport Fisheries & Wildlife N - Soll Moisture	

5,R-11,484

AS OF JULY 1, 1963

SOIL PROFILE CURRENT DATA PAST RECORD

DATE

DATE

			SOIL F	ROFILE	CURRENT	DATA	PAST	RECORD
NO.	SOIL MOISTURE STATION NAME	ELEVATION	DEPTH	FIELD	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
		COLUMB	TA RIVE	R BASIN				
Flathead 13A02M 13A05M	Desert Mountain Marias Pass	5600 5250	54 54	8.4 6.5	7/12 6/30	8.6 6.0	7.1 5.2	8.1 5.1
Clark For 13C15M 13B19M	<u>rk</u> Georgetown Lake Seeley Lake	6450 4030	48 48	8.3 10.6	6/26	7.4	7.3	ess.
Bitterroo 13D18M 14C05M	ot Gibbons Pass Lolo Pass	7100 5250	48 48	7.1 8.5	6/28 6/28	6.8 8.6	6.3	
		MISSOUR	RI RIVE	R BASIN				
Beaverhes	ad Lakeview	6700	48	15.3	7/1	14.8	12.8	esa
Madison 10D04M	Red Bluff	4800	40	4.7	e s.	en.	=	es).
Gallatin 11DO2M 11EO6M	College Site Twenty-One Mile	4856 7150	54 48	14.5 8.8	6/29 6/28	11.6	10.0	9.1
Missouri 10001M 12008M	<u>Main Stem</u> Kings Hill Stemple Pass	7420 6350	48 48	11.8	6/28 7/2	10.8 5.4	65.	esa esa
Yellowsto 10D11M 10D07M 10C04M	<u>Dne</u> Battle Ridge Northeast Entrance Shields River	6020 7350 5850	48 48 48	15.4 9.4 17.8	7/1 6/30 7/1	17.7 8.9 14.7	15.6 8.1 13.8	670. 670. 885.



AS OF AUGUST 1, 1963

		AS OF		(Inches)				
			SOIL	PROFILE	CURRENT	T DATA	PAST	RECORD
NO.	SOIL MOISTURE STATION NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
		<u>COLUMBI</u>	A RIVE	R BASIN				
<u>Flathead</u> 13A02M 13A05M	Desert Mountain Marias Pass	5600 5250	54 54	8.4 6.5	7/31 7/30	7.0 4.4	5.1 3.6	6.2 3.8
Clark For 13C15M 13B19M	<u>rk</u> Georgetown Lake Seeley Lake	6450 4030	48 48	8.3 10.6	7/30 8/4	6.3 6.1	4•4 -	-
Bitterroo 13D18M 14C05M	ot Gibbons Pass Lolo Pass	7100 5250	48 48	7.1 8.5	7/30 7/29	5.8 6.9	5.9 -	-
		MISSOUR:	I RIVE	R BASIN				
Beaverhea 11E13M	ad Lakeview	6700	48	15.3	8/1	8.2	9.8	-
Madison 10D04M	Red Bluff	4800	40	4.7	-	-	1.4	-
Gallatin 11DO2M 11EO6M	College Site Twenty-One Mile	4856 7150	54 48	14.5 8.8	8/2 7/28	8.4 4.3	10.0	7.3
Missouri 10001M 12008M	<u>Main Stem</u> Kings Hill Stemple Pass	7420 6350	48 48	11.8 5.9	7/31 7/31	9.6 4.6		=
Yellowsto 10D11M 10D07M 10C04M	<u>one</u> Battle Ridge Northeast Entrance Shields River	6020 7350 5850	48 48 48	15.4 9.4 17.8	8/1 7/31 8/1	12.3 6.4 9.3	10.8 8.7 9.4	<u>-</u>



AS OF SEPTEMBER 1, 1963

		AS OF	- SEPTE		(Inches)			
			SOIL	PROFILE	CURRENT	DATA	PAST	RECORD
NO.	SOIL MOISTURE STATION NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	•• AVERAGE
		COLUMBI	A RIVE	R BASIN				
Flathead 13AO2M 13AO5M	Desert Mountain Marias Pass	5600 5250	54 54	8.4 6.5	9/5 8/31	4.6 2.8	4.8 3.2	4.6 3.7
Clark Fo: 13C15M 13B19M	<u>rk</u> Georgetown Lake Seeley Lake	6450 4030	48 48	8.3 10.6	8/26 8/31	2.6 3.8	2.6 -	-
<u>Bitterro</u> 13D18M 14C05M	ot Gibbons Pass Lolo Pass	7100 5250	48 48	7.1 8.5	8/28 8/30	4.9 4.3	5.0 -	-
		MISSOUR	I RIVE	R BASIN				
Beaverher 11E13M	<u>ad</u> Lakeview	6700	48	15.3	8/31	6.3	7.0	-
<u>Madison</u> 10D04M	Red Bluff	4800	40	4.7	mca.	-	1.7	-
Gallatin 11DO2M 11EO6M	College Site Twenty-One Mile	4856 7150	54 48	14.5 8.8	8/30 8/28	7.4 1.8	8.5 -	6 . 4
Missouri	Main Stem							
10001M 12008M	Kings Hill Stemple Pass	7420 6350	48 48	11.8 5.9	8/30 9/3	8.7 5.1	-	
Yellowsto 10D11M 10D07M 10C04M	<u>Dne</u> Battle Ridge Northeast Entrance Shields River	6020 7350 5850	48 48 48	15.4 9.4 17.8	8/30 8/31 8/30	8.0 5.0 7.6	8.3 6.9 7.3	- -



AS OF OCTOBER 1, 1963

		AS OF		(Inches)				
			SOIL F	ROFILE	CURRENT	DATA	PAST	RECORD
NO.	SOIL MOISTURE STATION	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAG
		COLUMBIA	A RIVER	BASIN				
Flathead 13A02M 13A05M	Desert Mountain Marias Pass	5600 5250	54 54	8.4 6.5	10/3 10/1	4.7 2.9	4.0 3.2	5.4 3.8
Clark For 13C15M 13B19M	<u>rk</u> Georgetown Lake Seeley Lake	6450 4030	48 48	8.3 10.6	9/30 -	2.6	2.3	-
<u>Bitterroo</u> 13D18M 14C05M	ot Gibbons Pass Lolo Pass	7100 5250	48 48	7.1 8.5	9/26 9/26	5.6 4.3	4.5	-
		MISSOUR	RIVER	BASIN				
Beaverhea 11E13M	a <u>d</u> Lakeview	6700	48	15.3	9/30	7.6	5.8	-
Madison 10D04M	Red Bluff	4800	40	4.7	-	-	1.2	-
Gallatin 11DO2M 11EO6M	College Site Twenty-One Mile	4 8 56 7150	54 48	14.5	9/27 9/29	6.3 4.5	7.8	6.6 -
Missouri 10001M 12008M	<u>Main Stem</u> Kings Hill Stemple Pass	7420 6350	48 48	11.8	10/2 9/30	7.8 4.5	-	-
Yellowsto 10D11M 10D07M 10C04M	o <u>ne</u> Battle Ridge Northeast Entrance Shields River	6020 7350 5850	48 48 48	15.4 9.4 17.8	9/30 9/30 9/30	8.2 8.4 9.4	7.5 7.5 7.1	-



SOIL MOISTURE DATA AS OF NOVEMBER 1, 1963

	AS OF NOVEMBER 1, 1963									
			SOIL P	ROFILE	CURRENT	DATA	PAST	(Inches)		
NO.	SOIL MOISTURE STATION	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE		
1		COLUMBIA	RIVER	BASIN	<u> </u>			L		
Flathead 13A02M 13A05M	Desert Mountain Marias Pass	5600 5250	54 54	8.4 6.5	11/12 11/5	5.1 3.2	6.4	5.9 4.7		
Clark For 13C15M 13B19M	rk Georgetown Lake Seeley Lake	6450 4030	48 48	8.3 10.6	10/29 10/31		3.3	Ξ		
<u>Bitterroo</u> 13D18M 14C05M	ot Gibbons Pass Lolo Pass	7100 5250	48 48	7.1 8.5	10/30 10/30		6.1	<u>-</u>		
		MISSOUR	RIVER	BASIN						
Beaverhes	ad Lakeview	6700	48	15.3	10/31	5.9	5.8			
Madison 10D04M	Red Bluff	4800	40	4.7			_	-		
Gallatin 11D02M 11E06M	College Site Twenty-One Mile	4856 7150	54 48	14.5	11/1 11/3	6.4 3.7	7.8	7.5		
Missouri 10001M 12008M	<u>Main Stem</u> Kings Hill Stemple Pass	7420 6350	48 48	11.8	10/31 11/2	7,9 3.8	-	<u>-</u>		
Yellowsto 10D11M 10D07M 10C04M	Dne Battle Ridge Northeast Entrance Shields River	6020 7350 5850	48 48 48	15.4 9.4 17.8	10/29 11/2 10/29	8.0	13.5 7.7 8.4	-		



AS OF DECEMBER 1, 1963

(Inches) PAST RECORD SOIL PROFILE CURRENT DATA SOIL MOISTURE STATION DATE FIELD SOIL LAST **AVERAGE DEPTH OF SURVEY MOISTURE CAPACITY YEAR NO. NAME ELEVATION COLUMBIA RIVER BASIN Flathead 13A02M Desert Mountain 5600 54 8.4 12/1 4.0 4.9 13A05M Marias Pass 5250 54 6.5 Clark Fork 13C15M 8.3 11/26 Georgetown Lake 6450 2.6 48 **3.5** 13B19M Seeley Lake 4030 48 10.6 12/2 1.2 Bitterroot 13D18M Gibbons Pass 7100 48 7.1 11/26 5.6 6.1 11/29 14C05M Lolo Pass 5250 48 8.5 4.9 MISSOURI RIVER BASIN Beaverhead 11E13M Lakeview 6700 11/30 48 15.3 8.9 5.5 Madison Red Bluff 10DOAM 4800 40 4.7 2.1 Gallatin 11D02M College Site 4856 54 14.5 11/29 6.5 11.8 9.0 11E06M Twenty-One Mile 8.8 11/30 7150 48 4.0 Missouri Main Stem

Yellowst	one							
10D11M	Battle Ridge	6020	48	15.4	12/2	9.2	14.4	-
10D07M	Northeast Entrance	7350	48	9.4	11/30	8.0	7.5	_
10C04M	Shields River	5850	48	17.8	12/2	9.3	8.6	-

48

48

11.8

5.9

7420

6350

12/2

11/25

7.8

4.1

10C01M

12C08M

Kings Hill

Stemple Pass



AS OF JANUARY 1, 1964

(Inches)

			SOIL P	ROFILE	CURRENT	DATA	PAST	RECORD
NO.	SOIL MOISTURE STATION NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
		COLUMB	IA RIVER	BASIN				
Flathead 13A02M	Desert Mountain	5600	54	8.4	12/31	5.6	6.8	6.7
13A05M	Marias Pass	5250	54	6.5	12/26	4.1	5.5	4.8
Clark Forl 13C15M 13B19M	<u>K</u> Georgetown Lake Seeley Lake	6450 4030	48 48	8.3 10.6	12/27 1/2	5.7 1.4	3.3	-
Bitterroot 13D18M 14CO5M	Gibbons Pass Lolo Pass	7100 5250	48 48	7.1 8.5	12/26 12/27	5.6 4.9	5. 9	-
		MISSOU	RI RIVER	BASIN				
Beaverhead 11E13M	<u>l</u> Lakeview	67 00	48	15.3	12/31	8.6	5.5	-
Madison 10D04M	Red Bluff	4800	40	4.7	12/30	1.7	2,6	-
Gallatin 11DO2M 11EO6M	College Site Twenty-One Mile	4856 7150	54 48	14.5 8.8	1/3 12/29	6.6 3.9	12.3	8.9
Missouri N 10001M 12008M	<u>Main Stem</u> Kings Hill Stemple Pass	7420 6350	48 48	11.8	1/3 12/30	7.8 4.0	-	-
Yellowstor 10D11M 10D07M 10C04M	<u>ne</u> Battle Ridge Northeast Entrance Shields River	6020 7350 5850	48 48 48	15.4 9.4 17.8	12/30 12/31 12/30	9.2 7.9 9.1	13.8 7.2 9.3	-



SNOW SURVEY DATA

AS OF JANUARY 1, 1964

CURRENT DATA

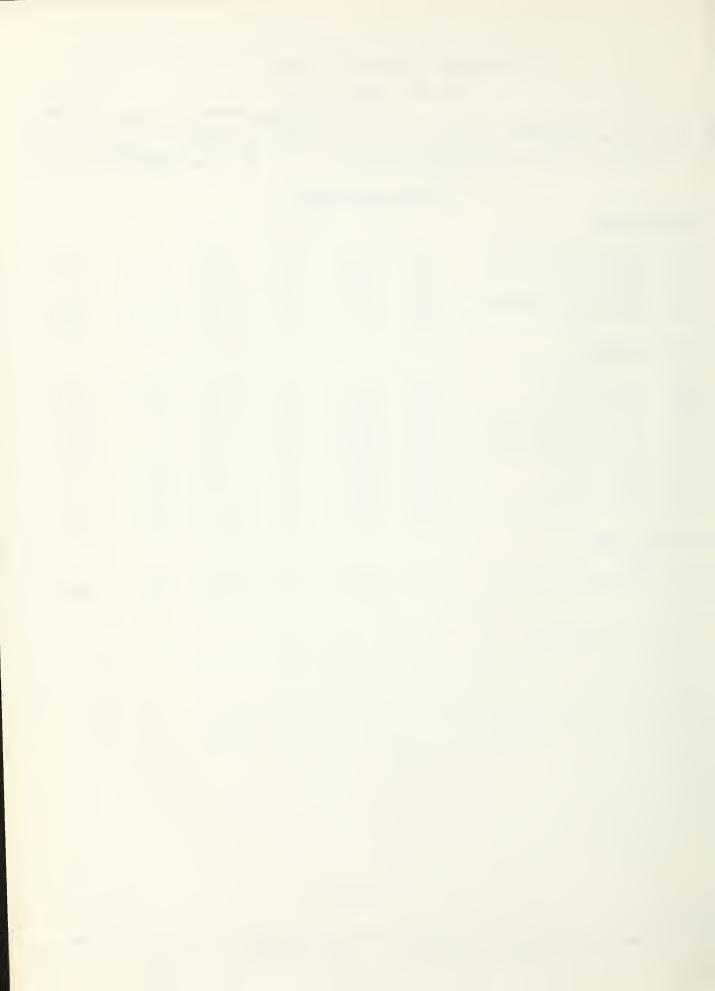
PAST RECORD

8.1 8.1 12.7*

		(C	URKENI DATA		PAST RECURU	
	SHOW COURSE		DATE OF	SHOW DEPTH	WATER	WATER (CONTENT
NO.	NAME	ELEVATION	SURVEY	DEFIN	CONTENT	LAST YEAR	AVERAGE
		COLUMBIA	RIVER BA	ASIN			
FLATHE	AD RIVER						
13A02 14A03 13A05 13B02 13B11	Desert Mountain Hell Roaring Divide Marias Pass Spotted Bear Mountain Twin Creeks	5600 5770 5250 7000 3580	12/31 12/31 12/28 1/2 1/3	22 38 22 18 11	5.2 10.6 5.2 4.0 2.8	4.0 - 5.8 3.3 1.5	6.4* - 8.1 7.7* 5.3*
CLARK F	TORK RIVER						
13B10 15B02 13C21 13C22 13C08 13C18 13C07 13C01 14B01	Coyote Hill Lookout Lubrecht Forest No. 3 Lubrecht Forest No. 4 Lubrecht Forest No. 6 Spring Gulch Storm Lake Stuart Mountain TV Mountain	4200 5250 5450 4650 4040 6000 7780 7400 6800	12/31 12/30 12/26 12/26 12/26 12/30 12/27 12/30 12/27	12 49 16 11 12 19 19 40 26	2.3 12.8 2.6 1.7 1.8 3.8 3.8 11.0 5.0	1.2 9.0 - 0 1.3 5.6 7.4 4.0	5.0* 16.4* 2.9* 1.6* 1.5* - 6.6*
BITTERF	ROOT RIVER						

7100 12/26 32

13D02 Gibbons Pass



SNOW SURVEY DATA

AS OF JANUARY 1, 1964

(Inches)

			CI	JRRENT DATA		PAST R	ECORD
	SNOW COURSE		OATE OF	SNOW DEPTH	WATER	WATER C	ONTENT
NO.	NAME	ELEVATION	SURVEY	UEFIN	CONTENT	LAST YEAR	AVERAGE
		MISSOURI	RIVER BA	SIN			
BEAVERH	EAD RIVER						
12E03 11E12	Camp Creek Kilgore	6 8 00 6200	12/30 12/27	15 16	2.8	2.2	4.2* 4.6*
JEFFERS	ON RIVER						
12001	Pipestone Pass	72 00	12/26	8	1.6	3.0	2.7*
MADISON	RIVER						
11E09 11E05 11E10 10E02 11E08 11E07	Big Springs Hebgen Dam Island Park Norris Basin Valley View West Yellowstone	6500 6550 6315 7500 6500 6700	12/29 1/2 12/29 12/26 12/29 1/2	26 20 23 18 22 17	5.8 4.2 4.5 3.8 4.6 3.4	3.2 2.2 3.0 3.1 4.7 2.3	8.2 5.9 6.4 4.6* 5.8 5.7
<u>GALLATI</u>	N_RIVER						
11E06	Twenty-One Mile	7150	1/2	27	5.7	3.6	8.6
MISSOUR	I MAIN STEM						
12005 12002 12003 12004	Chessman Reservoir Tenmile Lower Tenmile Middle Tenmile Upper	6200 6250 6800 8000	1/4 1/3 1/3 1/3	7 12 18 22	1.5 2.3 3.6 5.1	0.5 1.9 3.4 4.4	2.2 3.5 5.3 6.7
UPPER Y	ELLOWSTONE RIVER						
10E03 10E06 9D05 10E04 10E01 10D07 10E05 10E07	Canyon East Entrance Grizzly Peak Lake Camp No. 2 Lupine Creek Northeast Entrance Sylvan Pass Thumb Divide	7750 7000 8400 7850 7300 7400 7100 7900	12/30 12/30 12/31 12/30 1/2 12/31 12/30 12/30	28 18 14 14 17 14 22 24	3.6 2.9 2.4 2.1 2.9 2.8 4.3 5.6	4.3 2.5 6.0 2.0 3.0 3.0 3.9 6.6	6.3* 4.7* - 4.5* 5.1* 4.0* 6.5* 10.2*



RESERVOIR STORAGE DATA

AS OF DECEMBER 31, 1963

(1000 Acre Feet)

		(1000 Acre Feet)			
		USEABLE STORAGE			
BASIN	RESERVOIR	USEABLE CAPACITY	THIS YEAR	LAST YEAR	AVERAGE
COLUMBIA RIVER	R BASIN				
Flathead	Hungry Horse	3,428.0	2,995.0	3,155.0	2,883.0**
	Flathead Lake Camas <u>1</u> /	1,791.0 45.2	1,532.0 16.9	1,610.0 24.8	1,257.0 23.8
02 1 7 1	Mission Valley 2/	100.3	15.8	25.1	28.2
Clark Fork	Georgetown Lake	31.0	28.4	27.7	25.3
Dittompet	Noxon	334.6	326.7	331.3	- 0 3
Bitterroot	Como Painted Rocks	34.9 31.7	3.4	15.0	9.3 10.6**
	rainted nocks	21.1	_	_	10.0~
MISSOURI RIVER	R BASIN				
Beaverhead	Lima	84.0	16.4	25.0	32.4
Ruby	Ruby	38.8			22.7**
Madison	Hebgen Lake	384.8	211.3	233.6	240.3
0-11-48-	Ennis Lake	41.0	39.0	39.4	37.6
Gallatin	Middle Creek	8.0	2.8	4.1	3.1** 1,682.0**
Missouri	Canyon Ferry Hauser & Helena	2,043.0 61.9	1,760.0 60.7	2,015.0 53.6	54.9
	Lake Helena	10.4	10.0	7.6	8.3**
	Holter Lake	81.9	70.8	73.0	71.6
	Smith River	10.7	7.1	7.3	5.0**
	Ackley Lake	5.8	ca.	_	3.9
	Durand	7.0	3.6	5.3	4.3
	Martinsdale	23.1	8.2	8.9	9.5
	Deadman's Basin	72,2	-	42.1	48.5**
	Fort Peck	19,410.0	12,010.0	10,040.0	11,060.0
Sun-Teton	Gibson	105.0	14.9	33.6	43.7
	Willow Creek	32.3	20.8	25.5	18.4
Marias	Pishkun Lower Two Medicine	32.0 16.6	17.6 1.2	18.5 0	19.1 0
Marias	Four Horns	19.2	1 ∘ ≈	_	8.6
	Swift	30.0	8.6	8.6	18.1
	Lake Francis	112.0	33.4	65.9	94.4
	Tiber	1,313.0	639.0	625.7	626.2**
Milk	Fresno	127.2	43.1	36.1	66.6
	Nelson	66.8	34.9	48.3	37.2
	Lake Sherburne	66.1	-	9.2	16.3
Yellowstone	Mystic Lake	20.8	13.8	14.7	14.5
	Tongue River	68.0 27 . 5	14.5	26.6	7.9 8.8
	Cooney				

^{1/} Sum of four small reservoirs on west side of Flathead Lake.
2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.



Agencies Cooperating in Collecting Data Contained in this Bulletin

- U. S. Forest Service Region 1, Missoula, Montana
- U. S. Geological Survey Helena, Montana
- U. S. Army Corps of Engineers Portland, Oregon Seattle, Washington Omaha, Nebraska Riverdale, N. D.
- U. S. Indian Irrigation Service St. Ignatius, Montana
- U. S. Weather Bureau Helena, Montana
- U. S. Bureau of Sports Fisheries and Wildlife Red Rock Lakes Refuge Monida, Montana
- U. S. Bureau of Reclamation Billings, Montana Boise, Idaho
- Montana Power Company Butte, Montana
- Agricultural Experiment Station North Montana Branch Station Havre, Montana
- Agricultural Experiment Station North Montana Branch Station Havre, Montana

- National Park Service Yellowstone National Park Glacier National Park
- Montana Experiment Station Montana State College Bozeman, Montana
- Bonneville Power Administration Portland, Oregon
- Montana State University School of Forestry Missoula, Montana
- Soil Conservation Service Montana, Wyoming, Idaho
- Soil Conservation Districts Montana Counties
- Johnson Flying Service, Inc. Missoula, Montana
- Water Rights Branch, Dept. of Lands and Forests Victoria, British Columbia
- Department of Northern Affairs and National Resources Calgary, Alberta
- State Engineer
 Montana and Wyoming

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